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Chemical & Engineering NEWS

Cover: Fluorescing resinite particles in a resinite concentrate from Hiawatha coal seam in Utah. Photo courtesy of Southern Illinois University

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Australia plans growth in petrochemicals

Expansion of petrochemical and plastics industries in the 1980s assumes increased domestic demand as well as adequate feedstock supplies

Australia plans considerable expansion of its petrochemical and plastics industries in the 1980s. Indeed, development projects under discussion would more than triple ethylene capacity, to about 900,000 metric tons a year, by 1990.

A look at the prospects and possible developments over the rest of this decade—particularly for production of olefins and synthetic resins—is given by a recent report by the Chemicals & Plastics Industries Advisory Council (CPIAC) of Australia's Department of Industry & Commerce. The report includes data prepared by the Australian Chemical Industry Council.

The petrochemical industry in Australia expanded rapidly in the 1970s, growing faster in production, productivity, and investment than manufacturing industry in general. This followed rapid growth in the 1950s and 1960s, based originally on wartime, government-built plants. Tariff barriers have protected domestic producers. Tariff rates for polyolefins still are generally higher than in other countries.

The industry now is approaching maturity, and the current development phase calls for construction of ethylene and other plants of almost world-scale size. (In the past, it often has been considered more economical to build smaller local plants because of very high freight costs, sacrificing economies of scale.)

Sales in the synthetic resins and synthetic rubber industry amounted to about $808 million for July 1979 to June 1980, the most recent year for which figures are available. Nearly 5100 are employed in the industry. Most of the production is sold domestically. (Exports of major resins totaled 5% of domestic consumption in 1979–80.)

The two major petrochemical complexes are located at Altona, Victoria, and at Botany, New South Wales, near the main markets in Sydney and Melbourne. The main feedstocks for the Altona complex are ethane from Bass Strait and gas oil from a local refinery. The Botany complex's major feedstock is naphtha.

Between 1965 and 1974, Australia's domestic ethylene market grew more than 13% a year. The rate of growth has slowed since—a natural consequence of the industry's maturing. Synthetic resins have to some extent already replaced other materials.

However, consumption of ethylene-based polymers still is projected to grow 7% a year in 1980–85 and 6.5% a year in 1985–90, almost doubling from 354,000 metric tons a year in 1980 to 682,000 in 1990. These are considerably higher growth rates than anticipated for consumption of these resins in the U.S. and Western Europe. Australian per capita consumption of all resins was only 40 kg in 1979, compared to 105 kg in West Germany and 77 kg in the U.S.

Australia's demand for ethylene presently exceeds production capacity, and ethylene is being imported into Botany until current plant expansions are completed. Butadiene capacity also is inadequate to demand (now about 35,000 metric tons a year). On the other hand, propylene capacity exceeds domestic demand. The market for polypropylene is at an earlier stage of development than for polyethylene, and polypropylene consumption is projected to grow 9.6% a year in 1980–85 and 7.3% a year in 1985–90, rising from 62,000 metric tons in 1980 to 139,000 in 1990.

The expected increase in demand for ethylene raises two questions, notes the CPIAC report: Will local plants have the capacity to handle that volume? And from where will feedstocks come?

Demand for ethylene is expected to grow to about 603,000 metric tons a year by 1990. Currently, about 120,000 metric tons a year is produced from Bass Strait ethane, 100,000 from refinery and imported naphtha (40% imported from Bahrain), and 50,000 from refinery gas and gas oil. Planned expansion in the Botany and Altona complexes at a cost of some $740 million—to be completed by 1985—will increase ethylene output about 350,000 metric tons a year.

Moreover, under consideration by several interests, including Japanese firms, is an ethylene plant development in South Australia that may cost as much as $1 billion or more. That plant also will produce chlorine, caustic soda, and dichloroethylene. And new petrochemical developments have been discussed for

Consumption of ethylene polymers will nearly double by 1990 . . .

Thousands of metric tons	1980[a]	1985	1990	Annual growth 1980–85	Annual growth 1985–90
Polyvinyl chloride	137	189	251	6.7%	5.8%
Polyethylene, low density	120	167	232	6.8	6.8
Polyethylene, high density	61	93	138	8.7	8.2
Polystyrene	36	48	61	5.9	4.9
TOTAL	354	497	682	7.0%	6.5%

. . . as will Australian market demand for ethylene

Thousands of metric tons of ethylene equivalent	1980	1985	1990
Polyvinyl chloride	68	92	122
Polyethylene, low density	125	175	240
Polyethylene, high density	66	98	145
Polystyrene	12	15	20
Other ethylene derivatives	45	60	76
TOTAL	316	440	603

a Annual average over 1978–80 taken as base to eliminate unrepresentative figures in 1979–80 caused by abnormal market forces. Source: Australian Chemical Industry Council

Western Australia by a consortium of leading Australian companies (based on feedstocks from the North West Shelf) and for northern Queensland by Occidental Petroleum.

Australia is relatively well endowed with feedstock for petrochemical expansion until at least 1990, based on continued development of its oil and natural gas fields—especially the latter, the CPIAC report says. If all the development projects were to be built, total ethylene capacity would rise to about 900,000 metric tons a year. Feedstocks used at present might provide about 500,000 metric tons of this total (350,000 from ethane, 100,000 from naphtha, and 50,000 from other refinery products). The remaining 400,000 metric tons of ethylene could be produced by use of liquefied petroleum gas (LPG), most of which is exported.

However, Australia's government is giving high priority to plans for use of LPG as a motor vehicle fuel. Thus, the report concludes, to meet a possible shortfall in feedstocks in the late 1980s or early 1990s, a change in government policy on LPG use should be considered. □

Synlubes market set for growth in Europe

Traffic lights have flashed bright green for synthetic lubricants in the U.S. and abroad ever since Mobil started the market going in the mid-1970s. This product group has been touted as one of the fastest growth areas in the chemical industry—to the point of squeezing available raw materials and taxing companies' investment schedules.

Synlubes also support a flourishing market for consultants, who regularly map the future for this chemical group. It happens that synlubes have several quite different starting materials and end uses.

The latest study on synlubes treats the coming decade for the market in Europe. Growth in the European Economic Community figures to be good, though synlubes will remain tucked in a very small niche of the overall lubricant business, concludes consultants Frost & Sullivan of New York City and London. It won't all be smooth sailing either, as headwinds develop from poor economies and lower-cost substitutes.

Overall, Frost & Sullivan expects EEC volume in synlubes to more than double from 81,000 tons in 1980 to 197,000 tons in 1990. In constant 1980 dollars, market value would jump from $211 million to $495 million. More than 70% of 1980 sales were in just three countries—West Germany, France, and the U.K.

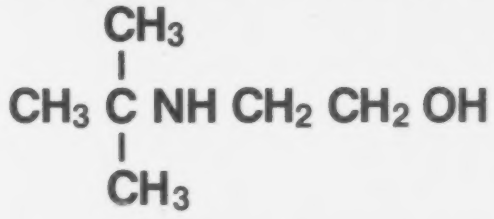
The big hope for the new lubricants is in the vast consumer automobile market. Frost & Sullivan puts sales growth in this market at 13 to 14% per year, pushing autos' share of the total synlubes market from about 26% in 1980 to nearly 39% in 1990. "The practice in recent years of European auto manufacturers to down-size car engines has led to starting problems in cold climates, and the high-revving engines of these small cars cause petroleum-based lubricants to break down after relatively low mileage. The starting problem has been particularly noticeable in diesel engine vehicles, particularly in the harsh winter of 1981–82. The growth of the diesel car market, estimated to average nearly 12% per year in EEC through the 1980s, is expected to increase demand for synthetics."

Synlubes' big market share jump in autos will come somewhat at the expense of market share in industrial uses such as hydraulic fluids, fire-resistant fluids, metalworking lubricants, and industrial gear lubricants. The industrial segment's cut of total sales is forecast to slip from 54% in 1980 to 48% in 1990. Similar below-average growth in aviation uses, just 5% per year, will bring down market share here from 20% to 13% during the 1980s.

But even with all this growth, synthetics scarcely will nick the overall lubricants trade. Synlubes accounted for less than 2% of the total EEC lubricants market in 1980, the study finds, despite average annual growth at 10% in the 1970s.

A possible brake to future synlubes growth could come in lower-cost competing products, the report warns. The current recession is causing companies to cut corners, and many potential end users of synthetics could turn to substantially cheaper mineral oil-based lubricants. Perhaps even more threatening, the report notes, is a recent development by some oil companies of "hydro-crack oils," specifically designed for the auto market featuring many of the synthetics' properties at a lower price. □

Try tertiary-Butylaminoethanol.



Another new alkyl alkanol amine from Pennwalt.

Pennwalt now has tertiary-butylaminoethanol available in commercial quantities. This new amine structure has several interesting known applications and potential for several other manufacturing processes. As a source of both a hydroxyl group and a specific amine radical, it is potentially useful in the synthesis of a number of pharmaceuticals. It is used to make acrylate esters, and cathodic electroplated materials. As an additive for polyester and alkyd resins it improves compatibility with other resins and increases solubility in aliphatic hydrocarbons.

For technical data and a sample, contact Market Development Department, Organic Chemicals Division, Pennwalt Corporation, Three Parkway, Philadelphia, PA 19102. (215) 587-7141.

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